ALBERTA CANCER BOARD

Epidemiology, Prevention and Screening

Cancer and Tobacco

The Picture in Alberta

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Division of Epidemiology, Prevention and Screening (EPS)
Cancer and Tobacco: The Picture in Alberta

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ALBERTA CANCER BOARD

Cancer and Tobacco: The Picture in Alberta

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Introduction

The Alberta Cancer Board is a provincial health authority providing and coordinating cancer control services in Alberta. Services include cancer prevention, early detection, diagnosis, treatment, research and education.

Cancer and Tobacco: The Picture in Alberta

The Alberta Cancer Board's Division of Epidemiology, Prevention and Screening prepared *Cancer and Tobacco: The Picture in Alberta*, as a means of sharing knowledge on issues related to cancer and tobacco, including: data on tobacco use; forms of tobacco exposure; health consequences of tobacco exposure; types of cancer related to tobacco use and the risks for each type among current, former and never-smokers; and information regarding various strategies for reducing tobacco use.

Although the focus of this monograph is on the direct relationship between tobacco use and cancer, the Alberta Cancer Board recognizes there are many other health problems associated with tobacco use, including heart and lung disease, risk of ulcers, miscarriages, stillbirths, premature births, low-birthweight babies and sudden infant death syndrome (SIDS)[1]; and chewing tobacco and snuff can cause receding gums, increased wear and tear on tooth enamel (contributing to tooth decay and stained teeth), and decreased senses of taste and smell.

Additional Sources of Information

Additional sources of information on a broad variety of health issues related to tobacco use, as well as on cessation programs and tobacco control, are listed in *Appendix A: Cancer and Tobacco Information*. In particular, the *ATRA Handbook: Tobacco Basics* provides detailed information on tobacco consumption and the other diseases associated with smoking. The Alberta Cancer Board's publication *Tobacco Reduction and Health*, a teaching module in the Healthy Lifestyle Series, outlines strategies for community-based activities to reduce tobacco use.

By sharing the above information, and working with Alberta's health professionals, the Alberta Cancer Board hopes to prevent cancers and save lives.

Basic Facts about Cancer and Tobacco

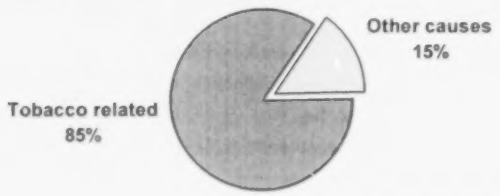
No matter how you look at it, tobacco abuse is always bad news. Cigarette smoking is the largest single ***preventable*** cause of cancer. It is also the largest single preventable cause of illness and premature death in Canada.

The Bad News about Cancer and Tobacco

Impact of tobacco use on lung cancer incidence

- About 1,400 Albertans and over 20,000 Canadians are diagnosed with lung cancer each year.[2]
- Smoking is related to about 85% of all new lung cancer cases.[3]

Impact of Tobacco Use on Lung Cancer Incidence



Impact of tobacco use on cancer deaths

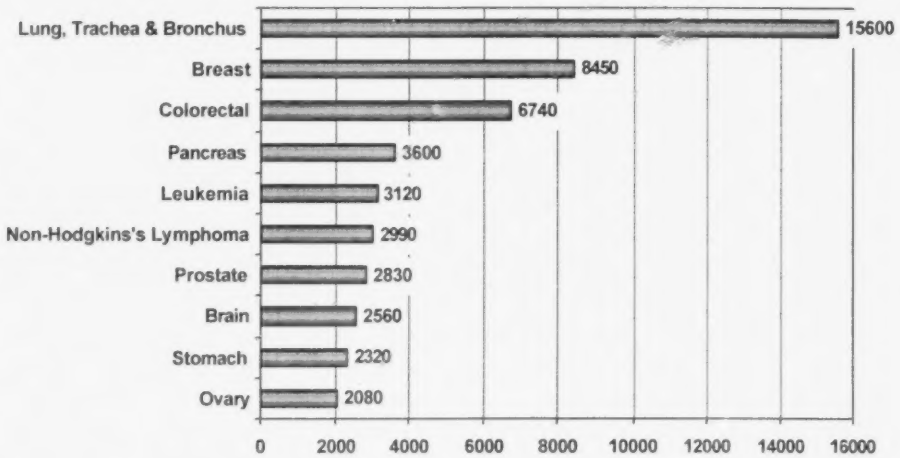
- 85% of those with lung cancer will die within five years of their diagnosis.[4]
- Smoking accounts for almost 30% of all cancer deaths.[5]

Impact of Tobacco Use on Cancer Deaths

- Smoking increases the risk for cancers of the mouth, throat, bladder, esophagus, kidney, pancreas and cervix.
- Environmental tobacco smoke (ETS), also known as secondhand or passive smoke, causes lung cancer in nonsmokers. Each year over 300 Canadians[6] die from lung cancer resulting from long-term exposure to the tobacco smoke ***of others***. ETS also creates other significant health problems for those exposed to it, especially children.
- Smokeless tobacco increases cancer risk, especially for oral cancer.

- In Alberta, in 1996, cancers of the respiratory system were the largest cause of potential years of life lost (PYLL) due to cancer.[7]

Potential Years of Life Lost (PYLL) due to Cancer, Alberta, 1996



The Encouraging News about Cancer and Tobacco

- 71% of Albertans and Canadians, do NOT smoke.[8]
- Quitting smoking is the most effective way for smokers to improve the quality and length of their lives. On average, people who quit smoking before age 50 cut their risk of premature death by half.[9]
- The health benefits of quitting are experienced by all smokers who quit: men and women, young and old, those who are well and those who already have smoking-related diseases.
- Former smokers live longer than continuing smokers.
- After 10 years of abstinence, ex-smokers have 30 to 50 percent less chance of developing lung cancer than continuing smokers. The ex-smokers also have a reduced risk of other smoking related cancers.[10]

Smoking Behaviours in Canada

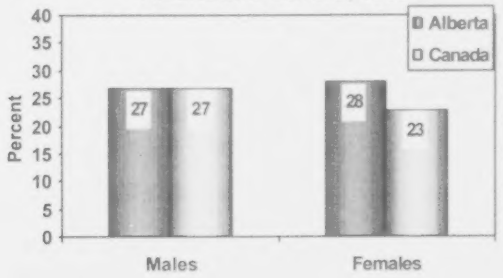
About 21% fewer Canadians use tobacco now than did 30 years ago, an encouraging statistic that is unfortunately offset by a grim one—smoking among teens increased by 25% over a four-year period in the early '90s. Fortunately, the percentage of teens smoking has decreased since then.

Smoking Behaviours in Alberta

In its 1999 Canadian Tobacco Use Monitoring Survey, Health Canada noted that in Alberta:

- 27% of Albertans aged 15 years and older were smokers—2% higher than the national average.[11]
- 27% of Alberta males and 28% of Alberta females were smokers—the same as the national average for males, but 5% higher than the national average for females.

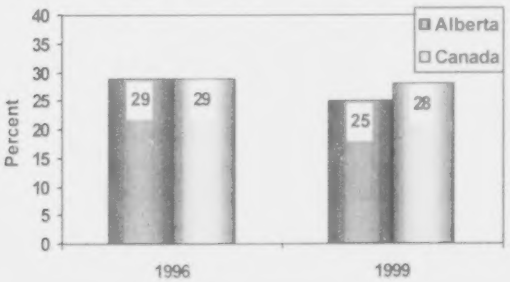
Percentage Smokers, Aged 15 Years and Older, Alberta and Canada, 1999



Smoking Behaviours among Youth

The survey also found that among youth aged 15–19 in Alberta, 25% were current smokers—3% less than the national average. This is encouraging since it represents a decrease in the percentage of youth smoking (down from 29% in 1996) while there has been only a 1% decrease nationally.

Smoking Prevalence Among Youth Aged 15-19



There was a trend to increased smoking among Canadian youth that began in 1992/93, when contraband supplies undermined the legal price of cigarettes. There was a further increase in young smokers after the tax on cigarettes was reduced in 1994/95 to combat the contraband sales. It is of interest to note the downward trend of smoking in youth shown in the 1999 survey. Future surveys will be needed to monitor this.

Awareness of smoking-related problems

The Health Canada 1994/95 study found that 91% of youth believed tobacco is addictive. The most common smoking-related health problems known by youth were lung cancer and heart disease. It is worth noting that their knowledge of health problems increased with smoking experience.[12]

The decision to smoke — or not

The level of education attained by an individual is an important sociodemographic predictor of smoking patterns. The higher the level of education, the less likely an individual is to smoke.

Harmful Components of Cigarette Smoke

Tobacco use is addictive, and this dependence on nicotine causes a smoker to be repeatedly exposed to carcinogenic and genotoxic elements associated with tobacco use. Harmful components of cigarette smoke include:

Nicotine

Nicotine is an addictive drug that can affect every organ in the body. It is rapidly absorbed and distributed from the bloodstream and can reach the brain within one minute of the first puff on a cigarette. Scientific research indicates that nicotine is not a carcinogen—its main hazard is that dependence on it means continued tobacco use.[13]

Tar

Tar coats the airways and lungs and contains thousands of chemicals—many of which are carcinogens and suspected carcinogens.

Carbon monoxide

Carbon monoxide is a poisonous gas that replaces some of the oxygen in the bloodstream.

Irritant substances

Irritant substances cause coughing and narrowing of the airways leading to the lungs, along with paralysis of the tiny hairs that clean the lungs. They can also affect air sacs in the lungs, leading to emphysema.

Carcinogenic substances

Many of the chemicals present in tobacco smoke have been identified as carcinogenic (see sidebar).

The Metabolism of Carcinogens in Cigarette Smoke

The metabolism of the many carcinogens in cigarette smoke is complex. In the respiratory tract, carcinogenesis is believed to be a multistep process. Affected cells go through a sequence of changes from being normal to becoming malignant. Cigarette smoking is therefore understood to affect all stages of the process of carcinogenesis, the late as well as the early stages. This fact explains why ceasing smoking has beneficial consequences related to lung and other cancers at any stage.

Chemicals Identified in Tobacco Smoke

Benzene[1]
2-Napthylamine[1]
4-Aminobiphenyl[1]
Nickel[1]
Formaldehyde[2] (Embalming fluid)
Hydrazine[2] (rocket fuel chemical)
N-Nitrosodimethylamine[2]
N-Nitrosodiethylamine[2]
N-Nitrosopyrrolidine[2]
1,3-Butadiene[2]
Aniline[2] (industrial solvent)
Benzo(a)pyrene[2]
N-Nitrodiethanolamine[2]
Cadmium[2]
Particulate matter (some[3])
Benz(a)anthracene[3]
g-Butyrolactone[3]
N-Nitrosonornicotine[3]
Carbon monoxide (auto exhaust; in gas chambers)
Carbon dioxide
Carbonyl sulfide
Toluene (industrial solvent; in explosives)
Acrolein (aquatic herbicide – burned glycerol)
Acetone (poisonous solvent; nail polish remover)
Pyridine (poisonous solvent)
3-Methylpyridine (insecticide solvent)
3-Vinylpyridine
Hydrogen cyanide (rat poison; in gas chambers)
Ammonia (poisonous gas; cleaning agent)
Methylamine (tanning agent)
Dimethylamine (tanning accelerator)
Nitrogen oxides
Formic acid (caustic solvent)
Acetic acid (caustic solvent)
Methyl chloride (poisonous refrigerant)
Nicotine (insecticide; cockroach killer)
Anatabine
Phenol (toilet bowl disinfectant)
Catechol (tanning, dyeing agent)
Hydroquinone (photographic developing agent)
2-Toluidine (agent in dye manufacture)
Cholesterol
Quinoline (specimen preservative)
Harman
NNK
Zinc (anti-corrosion coating for metals)
Polonium-2101 (radioactive element)
Benzoic acid (tobacco curing agent)
Lactic acid (caustic solvent)
Glycolic acid (metal cleaning agent)
Succinic acid (agent in lacquer manufacture)
PCDDs and PCDFs (Dioxins, Dibenzofurans)

[1]Known human carcinogen
[2]Probable human carcinogen
[3]Animal carcinogen

Source: From Table 3-1 for Cigarette Smoke, 1992 EPA Report, *Respiratory Health Effects of Passive Smoking: Lung Cancer and Other Disorders*
Common uses of certain chemicals adapted from *The Merck Index: An Encyclopedia of Chemicals, Drugs and Biologicals*, 11th ed., 1989

Lung Cancer: a Cancer Related to Tobacco Use

Lung cancer is the only major cancer whose death rates increased substantially and steadily from the 1930s into the 1980s.[14] It is the number-one cause of cancer deaths among men and women in Alberta, Canada and the world.[15] In Alberta, in 1997, lung cancer was responsible for 24% of all cancer deaths.

Lung Cancer Incidence and Mortality Rates in Alberta and Canada

As the following two tables indicate, lung cancer incidence and mortality rates in Alberta show a similar pattern to national rates. These rates are decreasing in males, but increasing in females. The decline in male rates has been attributed to their decreasing tobacco use. Although male incidence and mortality rates are moving in an encouraging direction, these rates are still considerably higher than for females.

Lung Cancer Age-Standardized° Incidence Rates/100,000			
PLACE	Sex	1996	1999
Alberta	Females	39	42*
	Males	67	67*
Canada	Females	42	45*
	Males	84	80*

*Estimated
°Age-standardized rates calculated using 1991 Canada Population Estimates
Sources: Canadian Cancer Statistics 1999, NCIC for national rates;
Alberta Cancer Registry, 1996 Annual Report Alberta Cancer Board 1998 for provincial rates

Lung Cancer Age-Standardized° Mortality Rates/100,000			
PLACE	Sex	1996	1999
Alberta	Females	32	35*
	Males	57	59*
Canada	Females	33	36*
	Males	72	70*

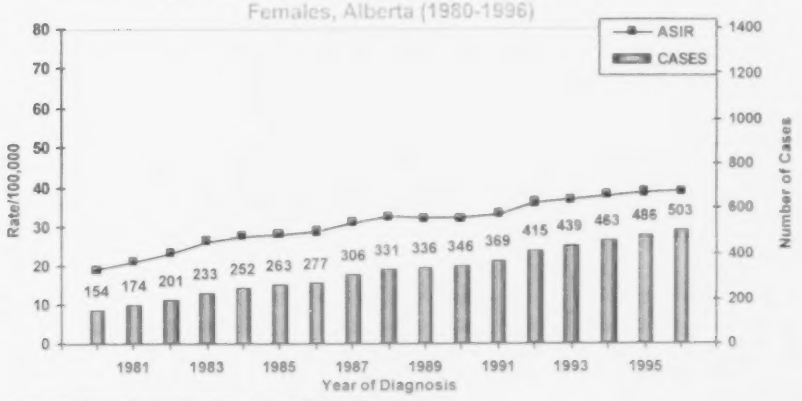
* Estimated
°Age-standardized rates calculated using 1991 Canada Population Estimates
Sources: Canadian Cancer Statistics 1999, NCIC for national rates;
Alberta Cancer Registry, Alberta Cancer Board for provincial rates

Alberta's Incidence and Mortality Trends for Lung Cancer

Alberta's incidence rates for lung cancer

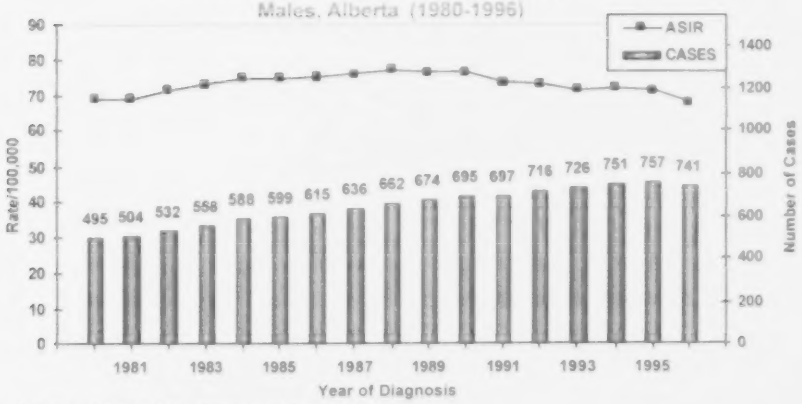
As the following two graphs indicate, the overall incidence rate for lung cancer in females has increased between 1980 and 1996, while that for males has decreased. Despite the decreasing trend in the lung cancer rate in males, the number of male lung cancer cases has increased over the same time period due to the aging and growth of the population. As the population continues to age and grow, the absolute number of lung cancer cases is expected to continue to rise.

Age-Standardized Incidence Rates (ASIR) and the Number of Cases for Invasive Bronchus, Lung & Trachea Cancer, Females, Alberta (1980-1996)



Source: Alberta Cancer Registry, Alberta Cancer Board
Standardized to 1991 Canada population (3 year moving averages)

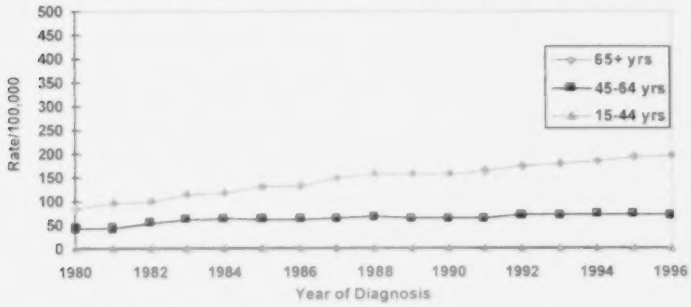
Age-Standardized Incidence Rates (ASIR) and the Number of Cases for Invasive Bronchus, Lung & Trachea Cancer, Males, Alberta (1980-1996)



Source: Alberta Cancer Registry, Alberta Cancer Board
Standardized to 1991 Canada population (3 year moving averages)

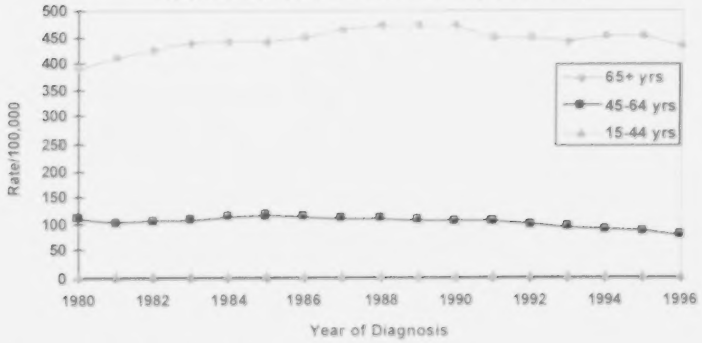
As shown in the following two graphs, males in the 45–64 age group show the strongest declines in incidence rates. The smoking prevalence among youth, if maintained, will lead to future increases in lung cancer incidence and mortality rates in the next 20 to 30 years.

Age-Specific Incidence Rates for Invasive Bronchus, Lung & Trachea Cancer, Females, Alberta (1980-1996)



Source: Alberta Cancer Registry, Alberta Cancer Board
(3 year moving averages)

Age-Specific Incidence Rates for Invasive Bronchus, Lung & Trachea Cancer, Males, Alberta (1980-1996)



Source: Alberta Cancer Registry, Alberta Cancer Board
(3 year moving averages)

Mortality rates in lung cancer show a similar pattern to the incidence rates

The trends in lung cancer incidence (as shown in graphs above and on previous page) and mortality (as shown in graphs on following page) reflect the trends in smoking behaviour 20-30 years previously. The decline in smoking rates among men in the 1970s and 1980s are beginning to be reflected in their decreasing lung cancer incidence and mortality rates.

The dramatic increase in lung cancer rates among women began approximately 30 years after the increase for men, which is consistent with the later adoption of smoking by women. Because smoking rates among women rose during the 1950s

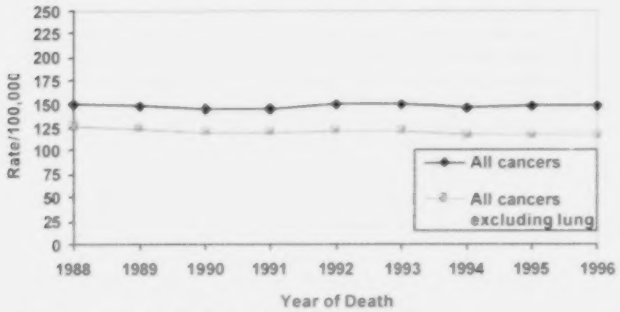
to 1970s, their incidence and mortality rates have also been rising. Estimated rates for lung cancer incidence and mortality among women in 1998 were over four times as high as in 1969.[16]

Alberta's mortality rates for cancer, including and excluding lung cancer

As shown below, when lung cancer is ***excluded***, the age-standardized cancer mortality rate is far lower for both males and females from 1988 to 1996 than when lung cancer is ***included.*** In fact, in women, mortality due to cancers excluding lung cancer is decreasing.

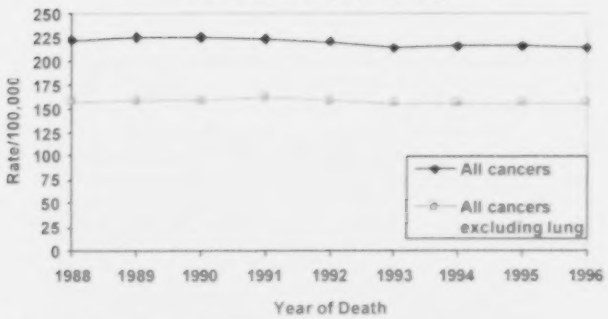
In 1993, for the first time, lung cancer exceeded breast cancer as the leading cause of cancer deaths in Canadian women. In Alberta, in 1996, the number of new female lung cancer cases still remained below the number of breast cancer cases, but the number of deaths from lung cancer (425) exceeded deaths from breast cancer (404). Lung cancer has a much poorer prognosis than breast cancer.[17]

Age-Standardized Mortality Rates for Invasive Cancers, Females, Alberta (1988-1996)



Source: Alberta Cancer Registry, Alberta Cancer Board
Standardized to 1991 Canada population (3 year moving averages)

Age-Standardized Mortality Rates for Invasive Cancers, Male, Alberta (1988-1996)



Source: Alberta Cancer Registry, Alberta Cancer Board
Standardized to 1991 Canada population (3 year moving averages)

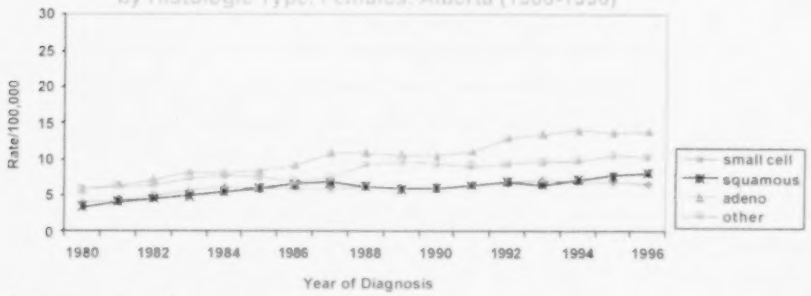
Smoking is Related to all Four Major Types of Lung Cancer

Smoking is related to all four major types of lung cancer—squamous cell, small cell, large cell and adenocarcinoma—with squamous cell and small cell having the closest links to smoking.[18] Most lung cancers start in the lung epithelium airways, with squamous cell and small cell carcinomas more likely to present in the central location of the lung, while adenocarcinomas are more likely to present in the periphery.

In females, the incidence rates of all forms of lung cancer, including small cell, squamous cell and adenocarcinoma have increased. In males, only the incidence rates of adenocarcinoma have increased while the incidence rates for both small cell and squamous cell have decreased.

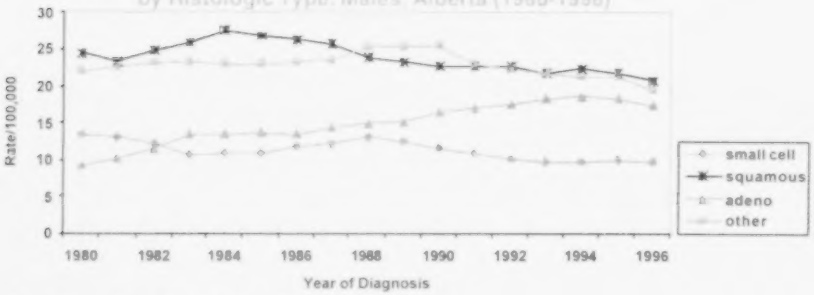
It is hypothesized that the increase in adenocarcinoma of the lung is due to the introduction of filter cigarettes in the 1960s, and to the introduction of "light" cigarettes, with lower nicotine and higher nitrate contents. These changes may result in smokers compensating with deeper and more frequent inhalation, resulting in increased delivery of the carcinogens to the peripheral lung where adenocarcinomas tend to originate.

Age-Standardized Incidence Rates for Invasive Lung Cancer by Histologic Type, Females, Alberta (1980-1996)



Source: Alberta Cancer Registry, Alberta Cancer Board
Standardized to 1991 Canada population (3 year moving averages)

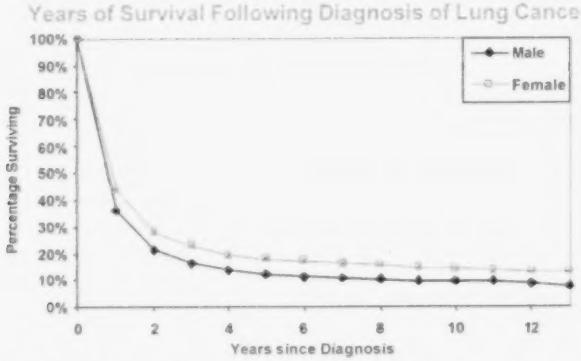
Age-Standardized Incidence Rates for Invasive Lung Cancer by Histologic Type, Males, Alberta (1980-1996)



Source: Alberta Cancer Registry, Alberta Cancer Board
Standardized to 1991 Canada population (3 year moving averages)

Survival Rates for Lung Cancer

Lung cancer is highly lethal. Only a small minority of patients are alive five years after diagnosis: 12% of males and 18% of females. These rates have not improved for the past decade.



Source: Alberta Cancer Registry, Alberta Cancer Board

Lung Cancer Risk

Heavy smokers face a risk of lung cancer up to 20 times higher than that of nonsmokers. Overall, cigar smokers may face the same risk of lung cancer as cigarette smokers once the risks are adjusted for differences in the level of inhalation and the quantity of tobacco smoked per day.[19]

Although lung cancer does occur in non-smokers, 85% of lung cancer is related to tobacco use.

Factors affecting lung cancer risk

- The risk rises with the number of years a person smokes, the number of cigarettes smoked per day, the degree of inhalation and possibly the age at initiation (there is conflicting evidence on whether smokers who began at a younger age are at higher risk because of that single factor). The duration of smoking is an even stronger determinant of lung cancer risk than the number of cigarettes smoked.[20]
- The combination of alcohol consumption and smoking greatly increases the risk.[21]
- An individual's "mutagen sensitivity" may also affect his/her cancer risk: some people have less ability to repair induced cell damage. Also, individuals with a susceptible genotype tend to develop cancer at earlier ages and with less cigarette exposure. Considerable differences in the prevalence of this genotype have been observed among ethnic groups—it is estimated to be 26% for Caucasians, 20% for African-Americans, 10% for Japanese and 3% for Mexican-Americans. There are probably numerous other genotypic factors that in combination also contribute to risk differences.[22]

- Radon, which occurs naturally in some mines and as an indoor pollutant entering through basements in some areas, is another cause of lung cancer. From a public health perspective, it represents a relatively small risk to the overall population, reinforcing the conviction that most efforts to reduce mortality from lung cancer should be focused on smoking.

Reducing the risk of lung cancer

Quitting smoking is the only way to significantly reduce the risk of lung cancer for smokers. As noted earlier, switching to low-tar and filter cigarettes might slightly reduce the risk, but this reduction in risk is most often offset by an increase in the number of cigarettes smoked and in the pattern of puffing and inhalation.

Those who have always smoked only cigars or pipes have a lower lung cancer risk than those who have always smoked cigarettes, however their risk is still significantly higher than that of never-smokers. Cigarette smokers who switch to pipes or cigars often tend to inhale more deeply and frequently than do pipe or cigar smokers who never smoked cigarettes.[23]

Effects of cessation

Ten years after quitting, the risk of lung cancer is decreased by about 30–50%. As abstinence continues, the risk continues to decline. However, former heavier smokers may never reduce their risk to the level of never-smokers.[24] Quitting also reduces the severity and extent of premalignant tissue changes in the epithelium of the lung.[25]

Other Cancers Related to Tobacco Use

Cancer of the Oral Cavity

Cells in the oral cavity (which includes the lips, tongue, salivary glands, gums, inner surfaces of the mouth, and pharynx) are directly exposed to tobacco smoke. Smokers have a 2–18 times higher risk of developing oral cancer than do never-smokers.[26] Cigar smokers face a risk that is 7–10 times higher than that of never-smokers. Cigarette, cigar and pipe smoking are established independent risk factors for oral cancer. Smoking, in conjunction with alcohol use, increases this risk further.

Smokeless tobacco use increases the risk of oral cancer by as much as 50 times among long-term users.[27] Studies also show that 40–60% of smokeless tobacco users develop oral leukoplakia (white lesions in the mouth that are often precancerous).[28]

Cancer of the Oral Cavity, Alberta, 1996

	Female	Male
Number of New Invasive Cases	76	174
Number of Deaths	33	54
Incidence Rate per 100,000	5.0	12.9
Mortality Rate per 100,000	2.2	4.4
5 year survival	69%	73%

Effects of cessation

After 3–5 years of not smoking, the risk of oral cancer decreases by about 50%. After 10 years of abstinence, some studies find the risk comparable to that for never-smokers.[29]

Quitting the use of smokeless tobacco reduces the prevalence of premalignant tissue changes in the mouth, but it is not known if the risk of oral cancer is reduced as well.

Cancer of the Larynx

An estimated 80% of deaths from cancer of the larynx are attributable to smoking. Tissue changes occur during ongoing smoking, progressing from cells with atypical nuclei, to in situ cancers, to invasive cancers.[30]

Chewing tobacco and snuff have also been linked to cancers of the larynx.

Cancer of the Larynx, Alberta, 1996		
	Female	Male
Number of New Invasive Cases	10	56
Number of Deaths	8	19
Incidence Rate per 100,000	0.7	4.9
Mortality Rate per 100,000	0.6	1.7
5 year survival	68%	73%

Effects of cessation

After 3–4 years of smoking abstinence, the risk for cancer of the larynx decreases as the years of abstinence increase, yet it still remains about six times higher than that of never-smokers. Those who quit also reduce the severity and extent of premalignant changes in the epithelium of the larynx.

Cancer of the Esophagus

Smoking is a major cause of cancer of the esophagus. As in the case of oral cancer, cigarette and cigar smoking are established independent risk factors for esophageal cancer, and are known to act in conjunction with alcohol to further increase the risk.[31] In various studies the risk of cancer of the esophagus for current cigarette and cigar smokers ranged between 2 and 6 times the risk for never-smokers.

Chewing tobacco and snuff have also been linked to cancers of the esophagus.

Cancer of the Esophagus, Alberta, 1996		
	Female	Male
Number of New Invasive Cases	36	58
Number of Deaths	25	48
Incidence Rate per 100,000	2.6	5.1
Mortality Rate per 100,000	1.8	4.3
5 year survival	19%	12%

Effects of cessation

Three years after quitting, former smokers show lower risks of esophageal cancer than current smokers.[32] Risk might be cut in half in as little as five years. This risk reduction is not due to lower alcohol consumption among the former smokers.

Cancer of the Pancreas

Smoking is a contributing factor in cancer of the pancreas, but the association is considerably weaker than that found between smoking and oral or laryngeal cancer. Studies show that cigarette smokers have risks of pancreatic cancer ranging from 1 to 5 times the risk for never-smokers.[33] Cigar smokers also have higher rates of pancreatic cancer than do nonsmokers.

Cancer of the Pancreas, Alberta, 1996		
	Female	Male
Number of New Invasive Cases	136	134
Number of Deaths	132	125
Incidence Rate per 100,000	9.9	12
Mortality Rate per 100,000	9.4	11.2
5 year survival	6%	6%

Effects of cessation

There is a weak but consistent association between cigarette smoking cessation and a lower risk of pancreatic cancer.[34] This may only be measurable after 10 years of abstinence.

Cancer of the Bladder

Of all the nonrespiratory cancer sites, the relationship between bladder cancer risk and cigarette smoking cessation has been most extensively studied. The risk among smokers is 1 to 7 times that of never-smokers.

Cancer of the Bladder, Alberta, 1996		
	Female	Male
Number of New Invasive Cases	61	157
Number of Deaths	23	59
Incidence Rate per 100,000	4.3	14.1
Mortality Rate per 100,000	1.6	5.5
5 year survival rate	79%	80%

Effects of cessation

After their first few nonsmoking years, former smokers reduce their risk of bladder cancer to about 50% that of current smokers. In contrast with findings for the other cancer sites, some studies suggest that this initial risk reduction is followed by very little subsequent reduction, even after 10–15 years of abstinence.[35]

Cancer of the Kidney

Cigarette smoking is believed to be a causal factor in kidney cancer, with current smokers having up to a 40% increased risk of the disease. No association has been observed between kidney cancer risk and the use of cigars, pipes or smokeless tobacco.

Cancer of the Kidney, Alberta, 1996

	Females	Males
Number of New Invasive Cases	98	165
Number of Deaths	44	68
Incidence Rate per 100,000	7.3	13.7
Mortality Rate per 100,000	3.3	6.1
5 year survival rate	64%	62%

Effects of cessation

Only small differences in mortality have been found between current and former smokers.

Cancer of the Cervix

Although human papillomavirus (HPV) infection is the most significant risk factor for cervical cancer, smoking may also contribute to cervical cancer development.

Cancer of the Cervix, Alberta, 1996

	Female
Number of New Invasive Cases	130
Number of Deaths	36
Incidence Rate per 100,000	9.2
Mortality Rate per 100,000	2.5

Other Cancer Sites Associated with Tobacco Use

There has been research on many other cancers suspected of being related to tobacco use. Smokers have been found to be at increased risk for **stomach**, **colorectal** and **liver** cancers, as well as some forms of **leukemia**. Whether the association between these cancers and tobacco is causal remains unclear.[36]

Cancer Sites Not Associated with Tobacco Use

Breast cancer

To date, cigarette smoking has not been found to be associated with breast cancer.

Ovarian cancer

There is little evidence of any association between smoking and cancer of the ovary.

Endometrial cancer

Endometrial cancer is the only cancer for which there is fairly consistent evidence of an *inverse* (protective) relationship with smoking. This may be due to smoking's effects on estrogen production and metabolism, and it may be limited to postmenopausal women. Studies indicate that current smokers have about a 30% lower risk of endometrial cancer than never-smokers, and that the risk for former smokers is similar to, or slightly greater than, that for current smokers. This has ***no public health relevance***, however, because the well-substantiated risks to other organ systems from smoking far outweigh any potential benefits to the endometrium.

Forms of Tobacco Exposure

Individuals are affected by tobacco when they smoke cigarettes, pipes or cigars, when they use snuff or spit tobacco, and when they are exposed to environmental tobacco smoke.

Smoking Cigarettes

It is estimated that 97% of tobacco users are cigarette smokers.[37] Smokers who choose cigarettes with lower tar and nicotine and with filters, in the hope of finding a safer product, are still at a significantly higher risk than nonsmokers. Also, exposure to the dangerous substances in tobacco is determined more by how a smoker smokes than by the type of cigarette smoked, and researchers find that smokers of low-tar cigarettes often tend to consume more cigarettes, puff more frequently and inhale more deeply. Furthermore, little data are available on how smoking low-tar or filter cigarettes affects the risks for other smoking-related diseases, including other cancers.

Smoking Pipes and Cigars

Individuals who smoke only pipes or cigars may face less risk of lung and laryngeal cancers than do cigarette smokers, but their risk remains higher than that for nonsmokers.[38] Chemical analysis of smoke from pipes, cigars and cigarettes indicates that carcinogens are found in similar levels in the smoke of all these tobacco products. Smoke condensates from pipes and cigars may be equally, if not more, carcinogenic than condensates from cigarettes. The lower risk of lung cancer for pipe and cigar smokers is due to the lesser amount of tobacco smoked and the lower degree of inhalation. However, because cigars burn more tobacco, they also generate more environmental tobacco smoke.[39] Cigar smokers may therefore ultimately face the same risk of lung cancer as cigarette smokers once the above risks are adjusted.[40]

Smokeless Tobacco

Chewing tobacco and oral snuff have been linked to cancers of the pharynx, larynx and esophagus.

Smokeless tobacco contains nicotine, carcinogens and other harmful substances. Dipping snuff is highly addictive, and exposes the body to levels of nicotine equal to those of cigarettes.[41]

Smokeless tobacco use is associated with numerous health risks

Smokeless tobacco can cause cancers of the oral cavity, nasal sinus, larynx, esophagus and bladder, as well as precancerous lesions in the mouth (leukoplakia). Smokeless tobacco users have a 50% higher risk of getting gum and cheek cancer than do non-users. They also increase their risk of throat and stomach cancer, heart disease, dental and gum diseases, stomach problems and loss of their senses of taste and smell.[42]

Smokeless tobacco use by Alberta youth is more than double the Canadian average

According to the 1994 Youth Smoking Survey, the lifetime use of chewing tobacco and snuff among Albertans aged 10–19 is more than double the national average:

- 20% of Alberta youth have used chewing tobacco at least once (compared to 8% nationally).
- 7% of Alberta youth have used snuff at least once (compared to 3% nationally).[43]

Environmental Tobacco Smoke

Environmental tobacco smoke (ETS), also known as secondhand or passive smoke, contains exhaled smoke from a smoker, smoke released from a smouldering cigarette, contaminants released into the air while puffing, and substances diffused through the cigarette paper and the mouth end of the cigarette between puffs. Smoke from the burning end of a cigarette contains a higher concentration of hazardous substances than the smoke inhaled directly by the smoker, including: five times higher carbon monoxide levels, twice the nicotine, and three times the tar. Although filter tips can significantly reduce the concentration of contaminants inhaled by a smoker, they do not reduce the contaminants found in ETS.

ETS is the greatest source of indoor pollution

ETS is the greatest source of indoor pollution, and exposure to it is generally of longer duration than to that of inhaled smoke. While exposure to inhaled smoke is limited to the time it takes to smoke a cigarette, ETS is present and breathed in over several hours in a polluted environment.

Indoor ETS rates are higher in colder climates

In colder climates, such as Canada's, indoor ventilation rates are usually lower, resulting in higher rates of ETS indoors. This is compounded by the fact that home ventilation systems are not generally designed to remove smoke.

ETS is a significant cause of lung cancer in nonsmokers

In 1993 the United States Environmental Protection Agency stated that ETS is a significant cause of lung cancer in nonsmokers and classified it as a known human carcinogen. This controversial conclusion was based on over 30 epidemiological studies comprising more than 3,000 lung cancer cases in eight different countries. Of these studies, 24 found a higher risk of lung cancer among never-smokers who had been exposed to ETS. Those that categorized this risk by level of exposure to

smoke reported that the risk increased in proportion to the degree of exposure.[44] In the United States, nonsmokers exposed to ETS are 1.6 times more likely to develop lung cancer than nonsmokers not exposed to ETS.[45] In Canada, Health Canada estimates that over 300 nonsmokers die each year from lung cancer caused by ETS.[46]

ETS can also affect respiratory health

Besides being a cause of lung cancer, ETS can also affect the respiratory health of children and adults. Exposure during childhood, especially from parents who smoke, is linked to middle ear infections, lower respiratory tract infections, and exacerbation of preexisting asthma. There is also a possible link to the development of asthma in children with no previous symptoms. Children are more vulnerable to ETS than adults because they inhale more air and more pollutants relative to their total body weight.

ETS increases the risk of heart disease

Evidence is also steadily growing that exposure to ETS increases the risk of heart disease. In the United States researchers have estimated that ETS causes at least 10 times more deaths in nonsmokers from heart disease than from lung cancer, and the situation is likely to be similar in Canada.[47]

Reducing Tobacco Use in Alberta

An in-depth examination of strategies for reducing tobacco use is not the focus of *Cancer and Tobacco: The Picture in Alberta*. The following section does include an overview of the topic in order to help Alberta's health professionals in their efforts to develop and implement tobacco reduction programs. More information on strategies can be found in the Alberta Cancer Board's Lifestyles Series Teaching Package: *Tobacco Reduction and Health* (1999).

Excellent information to help smokers quit is available from many sources, including community health centres, family doctors and other health practitioners. See *Appendix A: Cancer and Tobacco Information* for organizational contacts and web sites.

Canada's Approach to Reducing Tobacco Use

The Canadian National Strategy to Reduce Tobacco Use was launched in 1985 (and renewed and updated in 1999) in order to bring together all levels of government and health organizations. It established four widely adopted goals:

- Prevention—preventing tobacco use among young people
- Cessation—persuading and helping smokers to stop using tobacco products
- Protection—protecting Canadians by eliminating exposure to second hand smoke
- Denormalization (added in 1999)—educating Canadians about the marketing strategies and tactics of the tobacco industry

These goals, accepted by tobacco reduction initiatives throughout Canada, aim to reduce both smoking and environmental tobacco smoke. They also promote the image of nonsmoking as the desirable norm, thereby providing an environment that encourages youth to remain tobacco free.

Alberta's Approach to Reducing Tobacco Use

In Alberta, the first three goals became part of a holistic approach to tobacco reduction that addressed the wide range of factors influencing a person's decision to smoke. In 1996, a coalition of organizations, including the Alberta Cancer Board, developed the Alberta Tobacco Reduction Plan. The plan focused on three areas:

1. Health—to decrease tobacco-related disease, injury, disability and death among Albertans
2. Environment—to decrease tobacco's harmful effects on indoor air quality and public safety
3. Economy—to decrease tobacco's cost burden on Alberta's citizens and economy[48]

ATRA's formation

This coalition led to the formation of the Alberta Tobacco Reduction Alliance (ATRA), formally launched during October 1998. ATRA is an alliance of government and non-government organizations and businesses all of whom have a vested interest in tobacco reduction. As of January 2000, there were 73 members of the alliance. ATRA is funded through a variety of sources including Alberta Health, Health Canada and non-government agencies. It also receives significant private corporate support.

ATRA's focus

ATRA's mission is "To reduce Albertans' harmful use of tobacco products." To achieve this mission ATRA is pursuing four strategic directions as defined in the Alberta Tobacco Reduction Plan:

1. Tobacco-free youth
2. Healthy and safe workplaces
3. Clean indoor air to breathe
4. Support for tobacco users who want to quit

In its first year of operation, ATRA initiated many projects that address these strategic directions, including:

- publication of a wide variety of materials and resources
- launch of a web site (www.tobaccotruth.com)
- formation of a five-point legislative public policy platform
- completion of a public opinion survey on how Albertans view tobacco
- launch of the massive television ad campaign: "What do you think?"
- plus many, many other initiatives.

Alberta organizations working with ATRA

As ATRA moves forward there will be an increasing focus on youth and tobacco use, support to workplaces who want to help their employees quit tobacco use, and continuation of additional advertising campaigns. As well, ATRA will commission a second public opinion survey, and continue to sign on new member organizations.

Many other organizations in Alberta that include tobacco reduction in their programs, either exclusively (e.g. Alberta Tobacco Control Centre) or as part of a larger agenda (e.g. Alberta Cancer Board), work within ATRA. These groups (see *Appendix A: Cancer and Tobacco Information*) also have their own tobacco-related educational programs and resources, designed to help health professionals, educators and communities as they work to plan, implement and evaluate community and school activities.

Strategies for Prevention of Tobacco Use

Prevention programs traditionally attempted to reduce or eliminate tobacco use through education programs that created broad public awareness of the serious health consequences of tobacco use. It is now recognized that awareness alone is not enough to alter behaviours. For example, it is ineffective to teach children that smoking is bad for you if the students then go home to parents who smoke, or go to the mall or other public places and sees widespread social acceptance of tobacco use. To encourage and help people become and remain tobacco free, it is also necessary to create a supportive social environment.

Prevention programs, therefore, now address a broader range of factors that influence a person's decision to smoke. They also involve parents and the community, in addition to health workers and educators, in dealing with tobacco reduction strategies. In many areas, coalitions have been formed to tackle specific issues, such as the development of municipal by-laws restricting or prohibiting smoking in public and other places, and the enforcement of laws prohibiting the sale of tobacco to minors.

Benefits of Stopping Tobacco Use

The benefits of quitting smoking are immediate and increase with time.

- The risk of death decreases soon after quitting and continues to do so for at least 10–15 years. After that, the overall risk is nearly the same level as for never-smokers. Health status at the time of quitting and previous levels of tobacco exposure also influence the degree of risk reduction.
- Smokers who quit before the age of 50 lower their risk of dying in the next 15 years by 50%.
- The sooner a smoker quits, the better, but even longterm smokers benefit from quitting. It's never too late to quit!

Strategies for Stopping Tobacco Use

Smokers attempting to quit and practitioners promoting smoking cessation face huge challenges. Virtually all people striving to stop smoking require several attempts before they are successful—quitting is not a straightforward process. Most smokers who quit do so on their own without cessation programs but health professionals can be important in influencing people to quit, providing positive reinforcement and assisting with the side effects.

Every office visit an opportunity to promote quitting

Clinicians are advised to use every office visit with a smoker as an opportunity to promote quitting. The Agency for Health Care Policy and Research (AHCPR) in the United States has developed a set of guidelines for effective interventions:

1. Every person who smokes should be offered smoking cessation treatment at every office visit.
2. Clinicians should ask about and record the tobacco-use status of every patient.
3. Cessation treatment even as brief as three minutes a visit is effective.
4. The more intense the treatment, the more effective it is in producing long-term abstinence from tobacco.
5. Nicotine replacement therapy (nicotine patches or gum), social support, and skills training are effective components of smoking cessation treatment.
6. Heath care systems should be modified to routinely identify and intervene with all tobacco users at every visit.[49]

Alberta Dental Tobacco Study

The Alberta Cancer Board, in collaboration with the Alberta Dental Association, the Alberta Dental Assistants' Association, the Alberta Dental Hygienists' Association and the University of Calgary, conducted research into the effectiveness of having tobacco cessation services offered by rural dentists.

The study provided dental offices with comprehensive resources and training.

The study concluded that patients, including smokers, feel that tobacco cessation services should be part of a dental office's routine.[50] Work is now being done to develop a full program based on this research.

The role of medication

Nicotine replacement medications are often prescribed to aid in quitting. Studies conducted mainly on the nicotine patch and gum have found both effective. Studies on the effectiveness of non-nicotine medications have had mixed findings.[51]

Chemoprevention

Many naturally occurring compounds inhibit lung tumour development caused by specific carcinogens. Research suggests they could someday be used in chemoprevention, to at least partially counteract carcinogen exposure connected with tobacco use, but further study is needed.[52]

Smoking cessation programs

Intensive cessation programs vary widely, but they typically consist of 4–7 sessions spanning at least two weeks, each session lasting 20–30 minutes. According to the AHCPR guidelines, counselling programs should offer problem solving and skills training along with social support and should aim to reinforce the motivation to

quit and to prevent relapses. Individually tailored self-help interventions are also effective with many smokers.

The Tom Baker Cancer Centre's smoking cessation program

The Alberta Cancer Board, among other organizations, promotes tobacco cessation programs. For the past 15 years, the department of Psychosocial Resources at the Tom Baker Cancer Centre, in Calgary, has been running clinics using behavioural modification, relaxation, self-hypnosis, stress management and weight control. A six-to-nine-year follow-up study of 329 attendees indicated 48% were not smoking, suggesting that cessation status is largely maintained by those who quit initially, and that many who did not initially quit did go on to successful cessation.

Protection — Community Action and Legislation

Tobacco protection measures have the following major goals:

- To bring about environmental changes that eliminate involuntary exposure to tobacco smoke in public places and the workplace
- To restrict smoking to designated areas or ban it completely in workplaces and public places
- To increase awareness that smoking is harmful to all, including the unborn

Legal action and its threat have been effective in bringing about many tobacco control reforms, such as the creation of smoke-free workplaces, restaurants and hotel rooms, and the prohibiting of tobacco sales to minors.

In a pioneering project, the Edmonton Public School System adopted a tobacco-free policy in September 1998, banning all forms of tobacco from their properties. Inspired by that example, a similar ban was established for public schools in Lethbridge and Fort McMurray and Catholic schools in Calgary. Other public school boards are considering following suit.

Community based action groups have been very effective at bringing about change. Alberta has several examples of successful coalitions. One of these, I CAN, is working to eliminate tobacco use in public within the community of Cochrane.

Coalitions such as the Alberta Tobacco Reduction Alliance (ATRA) and many other organizations locally, regionally and nationally are conducting ongoing campaigns to tighten and expand measures to protect the public from the many harmful effects of tobacco use.

Cancer and Tobacco: The Future Picture in Alberta

It would be fantastic if *Cancer and Tobacco: The Picture in Alberta* had a happy ending—a sunny snapshot of a promising tobacco-free future for our province. But that's not the case now and won't be in the foreseeable future.

While it is encouraging that about 21% fewer Canadians use tobacco now than they did 30 years ago, optimism is offset by the news that smoking among teens increased by 25% over a four-year period in the early '90s. Because smoking rates among women began rising in the 1950s, we are now seeing a dramatic increase in their lung cancer death rate. We can expect a similar pattern in the future due to the increased smoking among teens today.

Tobacco use is Canada's leading preventable cause of death. Smoking accounts for almost 30% of all cancer deaths and kills almost 3,500 Albertans and 45,000 Canadians each year—more people than killed by heroin, cocaine, alcohol, AIDS, fires, murders, suicides and car crashes combined.

Working Together to Improve the Picture

Tobacco exposure continues to be a serious concern for all Albertans and quitting smoking is the most effective thing smokers can do to improve the quality and length of their lives. The benefits of quitting smoking are immediate and increase with time. It's never too late to quit.

The Alberta Cancer Board is working to improve the picture in Alberta by collaborating with individuals and organizations throughout the province in an effort to help people become and remain tobacco-free. By working together with a comprehensive strategy such as outlined by ATRA, and by sharing our knowledge and resources, we can save more lives.

Appendix A: Cancer and Tobacco Information

Key Organizations

Action on Smoking and Health (ASH)
Box 4500 Stn. S., Edmonton, Alberta T6E 6K2
phone: 1-780-407-2620; fax: 1-780-407-6829
web site: <www.ash.org>

Alberta Cancer Board, Division of Epidemiology, Prevention and Screening
Room 382, 3330 Hospital Drive N.W., Calgary, Alberta T2N 4N1
phone: 1-403-220-8017; fax: 1-403-270-3898
e-mail: ellen.murphy@cancerboard.ab.ca

Alberta Cancer Board, Tom Baker Cancer Centre,
Department of Psychosocial Resources, Cessation Clinics
1331 – 29 Street N.W., Calgary, Alberta T2N 4N2
phone: 1-403-670-1767

Alberta Lung Association
1402 University Avenue, 3rd floor, Aberhart Centre, Edmonton, Alberta T6G 2B7
phone: 1-780-407-6819 (in Edmonton), 1-800-931-9111 (outside Edmonton);
fax: 1-780-407-6829
web site: <www.ab.lung.ca>

Alberta Tobacco Reduction Alliance (ATRA)
3rd floor, Aberhart Centre, 11402 University Avenue, Edmonton, Alberta T6G 2J3
phone: 1-780-407-3296 (in Edmonton); 1-403-541-5377 (in Calgary);
fax: 1-780-407-6494;
e-mail: jmcgill.atra@powersurfr.com
web site: <www.atra.ab.ca>

Canadian Cancer Society, Alberta/NWT Division
200, 2424 – 4th Street S.W., Calgary, Alberta T2S 2T4
phone: 1-403-228-4487 (in Calgary); 1-800-661-2262 (outside Calgary);
fax: 1-403-228-4506
Cancer Information Service: 1-888-939-3333
web site: <www.cancer.ab.ca>

Health Canada, Cancer Bureau
phone: 1-613-957-1786; fax: 1-613-941-5497
e-mail: margaret_de_groh@hc-sc.gc.ca
web site: <www.hc-sc.gc.ca/hpb/lcdc/bc>

Health Canada, Tobacco Programs Unit
4th floor, Jeanne Mance Building, Tunney's Pasture, Ottawa, Ontario K1A 1B4
phone: 1-613-954-8850; fax: 1-613-952-5188

Heart and Stroke Foundation of Alberta & NWT
1825 Park Road S.E., Calgary, Alberta T2G 3Y6
phone: 1-403-264-5549 (in Calgary); 1-888-473-4636 (outside Calgary)
fax: 1-403-237-0803
web site: <www.hsf.ab.ca>

National Clearinghouse on Tobacco and Health
170 Laurier Avenue West, Suite 1000, Ottawa, Ontario K1P 5V5
phone: 1-613-567-3050; 1-800-267-5234; fax: 1-613-567-5695
web site: <www.cctc.ca/ncth>

Additional Web Sites

Agency for Health Care Policy and Research
Rockville, Maryland
<http://www.ahcpr.gov/clinic/smokepcc.htm>

Alberta Tobacco Reduction Alliance (ATRA)
<www.atra.ab.ca>
<www.tobaccotruth.com>

Campaign for Tobacco-Free Kids
<www.tobaccofreekids.org>

World No-Tobacco Day (World Health Organization)
<www.who.int/ntday/>

Quit 4 Life
<www.quit4life.com>

Guide Your Parents to a Smoke-Free Future
<www.cctc.ca/sff/index.htm>

Health Canada Canadian Tobacco Use Monitoring Survey
<www.hc-sc.gc.ca/hpb/lcdc/bc/ctums/>

Health Canada Tobacco Reduction
<www.hc-sc.gc.ca/hppb/tobaccoreduction/>

Health Canada Youth Smoking Survey
<www.hc-sc.gc.ca/ehd/catalogue/tobacco_ pubs/yss.htm>

TeenNet: Using Information and Technology to Engage Teens in Smoking Prevention and Education
<www.cyberisle.org/teennet>

References

1. Ontario Tobacco Research Unit, *The Health Effects of Tobacco Use*. National Clearinghouse on Tobacco and Health, Ottawa, Ontario, March 1995, p. 6.
2. Alberta Cancer Registry 1996 Annual Report, 1998.
   Health Canada, "Lung Cancer in Canada," *Cancer Updates*. Ottawa, Ontario, June 1998.
3. Alberta Cancer Registry, 1999.
   Health Canada, "Lung Cancer in Canada," *Cancer Updates*. Ottawa, Ontario, June 1998.
4. Alberta Cancer Board, Division of Epidemiology, Prevention and Screening, Calgary, Alberta.
   American Cancer Society, *Cancer Facts and Figures*, 1998.
5. Ontario Tobacco Research Unit, *The Health Effects of Tobacco Use*, National Clearinghouse on Tobacco and Health, Ottawa, Ontario, March 1995.
   American Cancer Society, *Cancer Facts and Figures*, 1998.
6. Federal, Provincial and Territorial Advisory Committee on Population Health, *Toward a Healthy Future: Second Report on the Health of Canadians*. Ottawa: Health Canada, 1999, p. 104.
7. Alberta Cancer Registry 1996 Annual Report, 1998.
8. Health Canada, *National Population Health Survey Highlights*, Cycle 2, 1996/97, section 1.2, Ottawa, Ontario. 1999.
9. US Department of Health and Human Services, *The Health Benefits of Smoking Cessation, A Report of the Surgeon General*. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 90-8416, 1990.
10. Ibid.
11. Health Canada, *Canadian Tobacco Use Monitoring Survey (CTUMS)*, Wave 1, February –June 1999. Ottawa, Ontario, 1999.
12. Federal, Provincial and Territorial Advisory Committee on Population Health, *Toward a Healthy Future: Second Report on the Health of Canadians*. Ottawa: Health Canada, 1999, p. 104.
13. UN Focal Point on Tobacco or Health, *Social and Economic Aspects of Reduction of Tobacco Smoking by Use of Alternative Nicotine Delivery Systems (ANDS), Summary Report*. Adis International Limited, 1998, p. 17.
14. US Department of Health and Human Services, *Reducing the Health Consequences of Smoking: 25 Years of Progress, A Report of the Surgeon General*. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 90-8411, 1989.
15. Alberta Cancer Board, Alberta Cancer Registry: 1996 Annual Report, December 1998.
    National Cancer Institute of Canada, Canadian Cancer Statistics 1998, Current Incidence and Mortality, Toronto, 1998.
    ATRA, Truth About Tobacco, Health Effects, fn4, p. 48.
16. National Cancer Institute of Canada, Canadian Cancer Statistics 1998, Toronto, 1998, p. 24.
17. Alberta Cancer Registry 1996 Annual Report, 1998.

18. US Department of Health and Human Services, *Reducing the Health Consequences of Smoking: 25 Years of Progress, A Report of the Surgeon General.* U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 90-8411, 1989, p. 50.
19. National Institutes of Health (U.S.), National Cancer Institute, *Smoking and Tobacco Control, Monograph 9, Cigars: Health Effects and Trends*, February 1998, p. 120.
20. US Department of Health and Human Services, *Reducing the Health Consequences of Smoking: 25 Years of Progress, A Report of the Surgeon General.* U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 90-8411, 1989, p.44
21. Ontario Tobacco Research Unit, *The Health Effects of Tobacco Use*, National Clearinghouse on Tobacco and Health, Ottawa, Ontario, March 1995.
22. Cinciripini, Paul M., Hecht, Stephen S., Henningfield, Jack E., Manley, Marc W., and Kramer, Barnett S., "Tobacco Addiction: Implications for Treatment and Cancer Prevention," *Journal of the National Cancer Institute*, December 17, 1997, vol. 89, no.24, p. 1856
23. Nelson NJ. "Big Smoke" Has Big Risks: Daily Cigar Use Causes Cancer, Heart Disease. Journal of the National Cancer Institute, 1998; 90(8); 562-564.
24. US Department of Health and Human Services, *Reducing the Health Consequences of Smoking: 25 Years of Progress, A Report of the Surgeon General.* U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 90-8411, 1989, p. 55.
25. U.S. Department of Health and Human Services, *The Health Benefits of Smoking Cessation, A Report of the Surgeon General.* U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 90-8416, 1990.p. 135.
26. Ibid., p. 147.
27. National Clearinghouse on Tobacco and Health, Fact Sheet, Smokeless Tobacco in Canada, quoting WHO.
28. National Clearinghouse on Tobacco and Health, Fact Sheet, Smokeless Tobacco in Canada, quoting Surgeon General 1986.
29. U S. Department of Health and Human Services, *The Health Benefits of Smoking Cessation, A Report of the Surgeon General.* U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 90-8416, 1990.
30. Ibid., p. 131.
31. Ibid., p. 152.
32. Ibid.
33. Ibid., p. 155.
34. Ibid.
35. Ibid., p. 164

36. Ibid.
Doll, R., Cancers weakly related to smoking, British Medical Bulletin 52(1):35–49, January 1996.
Ontario Tobacco Research Unit, *The Health Effects of Tobacco Use*, National Clearinghouse on Tobacco and Health, Ottawa, Ontario, March 1995.
Giovannucci, E., Martinez, M.E., *Tobacco, colorectal cancer, and adenomas: a review of the evidence*, Journal of the National Cancer Institute 88(23):1717–30, December 1996.

37. Health Canada, *Survey on Smoking in Canada: Alternate Forms of Tobacco*, 1994.

38. US Department of Health and Human Services, *Reducing the Health Consequences of Smoking: 25 Years of Progress, A Report of the Surgeon General*. U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. DHHS Publication No. (CDC) 90-8411, 1989.
National Institutes of Health (U.S.), National Cancer Institute, *Smoking and Tobacco Control, Monograph 9, Cigars: Health Effects and Trends*, February 1998, p. ii, 114.

39. National Clearinghouse on Tobacco and Health, Fact Sheet, Cigars in Canada, April 1997.

40. National Institutes of Health (U.S.), National Cancer Institute, *Smoking and Tobacco Control, Monograph 9, Cigars: Health Effects and Trends*, February 1998, p. 120.

41. American Cancer Society, *1998 Facts and Figures: tobacco use. www.cancer.org/statistics/ccf98/tobacco*

42. National Clearinghouse on Tobacco and Health, *Fact Sheet: Smokeless Tobacco in Canada*. April 1997.

43. Health Canada, *1994 Youth Smoking Survey*, Health and Welfare Canada, Ottawa.

44. National Institutes of Health (U.S.), National Cancer Institute, *Smoking and Tobacco Control, Monograph 4, Respiratory Health Benefits of Passive Smoking Lung Cancer and Other Disorders*, The Report of the U.S. Environmental Protection Agency, August 1993, p. ix–x.

45. Ibid.

46. Ontario Tobacco Research Unit, *The Health Effects of Tobacco Use*, National Clearinghouse on Tobacco and Health, Ottawa, Ontario, March 1995, p. 9.

47. Ibid.

48. The Alberta Tobacco Reduction Plan, December 1996, p. 4.

49. Agency for Health Care Policy and Research, *Helping Smokers Quit: A Guide for Primary Care Clinicians*, Clinical Practice Guideline. Rockville, Maryland, April 1996. (Web site: <http://www.ahcpr.gov/clinic/smokepcc.htm>)

50. Campbell, S., Sletten, M., and Petty, T., "Patient Perceptions of Tobacco Cessation Services in Dental Offices," *Journal of the American Dental Association*, February 1999, vol. 130, p. 219–226.

51. Cinciripini et al., p. 1859.

52. Cinciripini et al., p. 1855.

About the Alberta Cancer Board

ALBERTA CANCER BOARD

Facilities and Services

The Alberta Cancer Board is a Provincial Health Authority operating cancer facilities and programs in Alberta. Services include cancer prevention, early detection, diagnosis, treatment, research and education. Also included in this role is coordinating, in cooperation with others, the planning, development and delivery of provincial cancer initiatives.

As part of this mandate, the Alberta Cancer Board operates:

- **Cancer treatment and research facilities:** Cross Cancer Institute in Edmonton and Tom Baker Cancer Centre in Calgary
- **Associate Cancer Centres:** Grande Prairie, Lethbridge, Red Deer and Medicine Hat
- **Community Cancer Centres:** Headwaters RHA 3 (in High River), RHA 5 (in Drumheller), East Central RHA 7 (in Camrose), Westview RHA 8 (in Hinton), Aspen RHA 11 (in Barrhead), Lakeland RHA 12 (in Bonnyville), Peace RHA 14 (in Peace River) and Northern Lights RHA 16 (in Fort McMurray)
- **Division of Epidemiology, Prevention and Screening:**
  - **Cancer research:** conducts research into population-based trends in cancer incidence, morbidity and mortality, the causes of cancer, prevention strategies and the early detection of cancer
  - **Alberta Cancer Registry:** a population-based registry of cancer cases in the province
  - ***Screen Test: Alberta Program for the Early Detection of Breast Cancer:*** a screening mammography and breast health education program with fixed-site offices in Calgary and Edmonton and mobile mammography services throughout the province
  - **Cancer prevention initiative:** provides a variety of services to RHAs, including cancer information, assistance with program and policy development, and linkages to resources

The Community Cancer Network

Community Cancer Network

The Alberta Cancer Board participates in the Community Cancer Network to connect cancer control efforts around the province and bring cancer services closer to home. The Community Cancer Network extends the Alberta Cancer Board's expertise in cancer control programs (including prevention, screening, diagnosis, treatment and care), cancer epidemiology and cancer research to urban and rural communities through collaboration with Regional Health Authorities and others.

The Alberta Cancer Board is a member of the Alberta Tobacco Reduction Alliance (ATRA).

ATRA ALBERTA TOBACCO REDUCTION ALLIANCE